

# Managing Obstetric Haemorrhage: A Case Series on Emergency Peripartum Hysterectomy

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## ABSTRACT

Emergency Peripartum Hysterectomy (EPH) remains a life-saving intervention for obstetric haemorrhage when bleeding is unresponsive to conservative measures. This case series highlights the clinical profiles and outcomes of four women who underwent EPH at a tertiary care center in India over the course of one year. The cases involved risk factors such as Placenta Accreta Spectrum (PAS), uterine rupture, and prior cesarean sections. The findings emphasise the importance of early recognition of high-risk conditions and prompt escalation to surgical management. This series offers valuable insights into the complexities of managing obstetric haemorrhage and reinforces the essential role of a coordinated team approach in improving maternal outcomes.

**Keywords:** Caesarean section, Placenta accreta spectrum, Uterine rupture

## INTRODUCTION

Obstetric haemorrhage is one of the most serious and life-threatening complications encountered during pregnancy and childbirth. It remains a leading cause of maternal morbidity and mortality worldwide, accounting for nearly 27% of maternal deaths globally [1,2]. In Low and Middle Income Countries (LMIC), the burden is disproportionately higher due to delayed access to healthcare, a lack of timely interventions, and limited resources. EPH is a radical yet life-saving surgical procedure performed when all other measures to control bleeding fail [3]. The incidence of EPH is largely increasing (from 0.24 to 8.7 per 1,000 deliveries) due to an increase in cesarean deliveries, which are closely associated with abnormal placentation and uterine rupture-two major indications for EPH [4]. Despite advances in obstetric care, EPH continues to present significant challenges, not only because of the technical complexity of the procedure but also due to the emotional and physical consequences for the patient. Given the high-risk nature of these cases, detailed documentation and review of EPH outcomes are essential to guide future clinical practice [4,5].

## CASE SERIES

### Case 1

A 28-year-old G4P2L2A1 woman from a middle-class background was admitted at 36 weeks of gestation, presenting with abdominal pain for one day. She was a fourth gravida with a history of two previous lower-segment cesarean sections (2017 and 2018) and one spontaneous abortion managed by dilatation and evacuation (2021). This planned pregnancy had been uneventful until 34 weeks when an ultrasound revealed complete placenta previa with anterior wall involvement and features suggestive of PAS (loss of hypoechoic plane, placental lacunae, and increased vascularity) [Table/Fig-1]. The patient was non-anaemic, normotensive, and euthyroid, with no history of hypertension or diabetes. The foetal heart rate was 144 bpm, and no scar tenderness was noted.

Given her obstetric history and diagnosis, a planned cesarean section was performed under spinal anesthesia using a Pfannenstiel incision. A live baby was delivered, and due to morbid placental adherence and a thinned myometrium, an obstetric hysterectomy was carried out [Table/Fig-2]. The placenta was sent for histopathological examination, which confirmed the diagnosis of placenta increta, consistent with the ultrasound findings suggestive

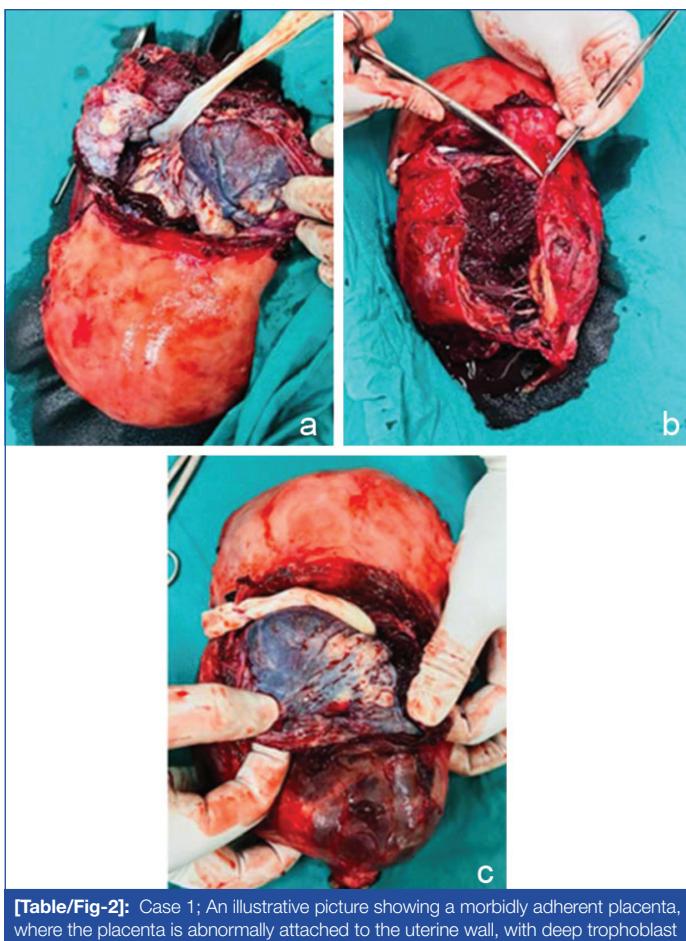


**[Table/Fig-1]:** Case 1; Ultrasound revealed complete placenta previa with anterior wall involvement.

of PAS. Postoperatively, the patient received three units of packed Red Blood Cells (RBC) and four units of Fresh Frozen Plasma (FFP). She was monitored in the Intensive Care Unit (ICU) for two days and received antibiotic prophylaxis. Both maternal and neonatal outcomes were favourable and they were discharged in stable condition on postoperative day 15.

### Case 2

A 36-year-old woman (G3P2L2) presented with a two-day history of abdominal pain and foul-smelling vaginal discharge. She had two previous vaginal deliveries requiring instrumental assistance, with neonatal weights of 1.9 kg and 2.1 kg in 2002 and 2005, respectively. She had no known medical conditions and was unaware of her current pregnancy, having received no antenatal care. On examination, her abdomen corresponded to a full-term uterus with palpable foetal parts, absent foetal heart sounds, and

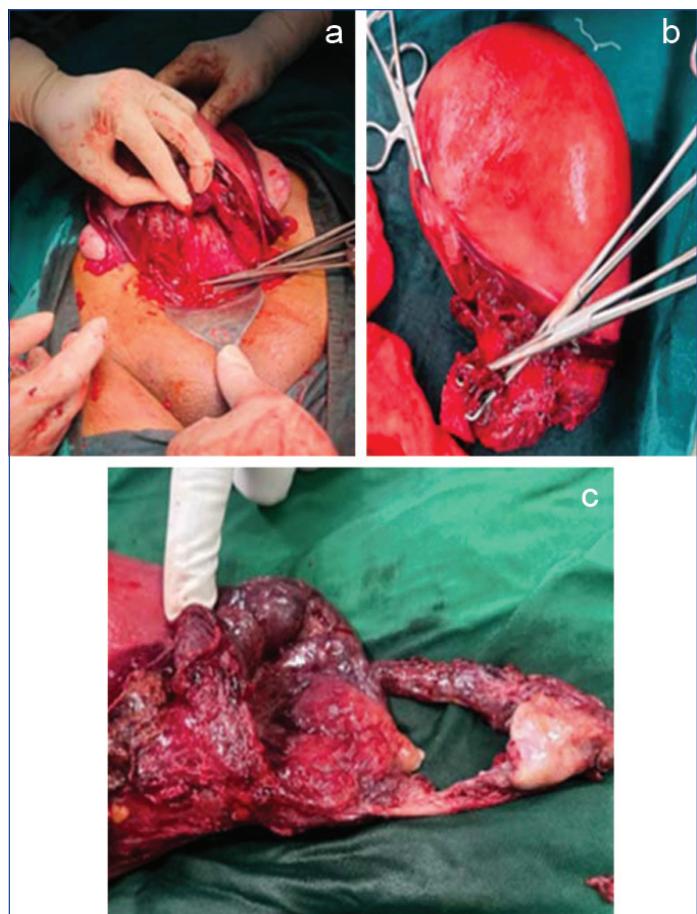


**[Table/Fig-2]:** Case 1; An illustrative picture showing a morbidly adherent placenta, where the placenta is abnormally attached to the uterine wall, with deep trophoblast invasion. The image highlights the excessive attachment, including visible blood vessels and the connection between the placenta and the uterine wall.

mild infraumbilical bulging. A per vaginal examination revealed full cervical dilation, absent membranes, a well-formed caput, and foul-smelling discharge. Vital signs showed blood pressure of 140/86 mmHg and a heart rate of 114 bpm with sinus tachycardia. Ultrasound confirmed intrauterine foetal demise. With a provisional diagnosis of obstructed labor, Intrauterine Foetal Demise (IUFD), and suspected uterine rupture, an emergency cesarean section was performed under general anesthesia. Intraoperatively, foul-smelling hemoperitoneum and a ruptured uterus with bilateral broad ligament involvement were noted. A macerated fetus was delivered, and an obstetric hysterectomy was performed [Table/Fig-3]. Ureteric safety was ensured with emergency cystoscopy and Double-J stenting. Postoperatively, she received two units each of packed Red Blood Cells (RBCs) and Fresh Frozen Plasma (FFP), along with antibiotics. She was monitored in the ICU and discharged in stable condition on day 19. Histopathology showed acute endomyometritis with necrotising cervicitis and ischemic changes.

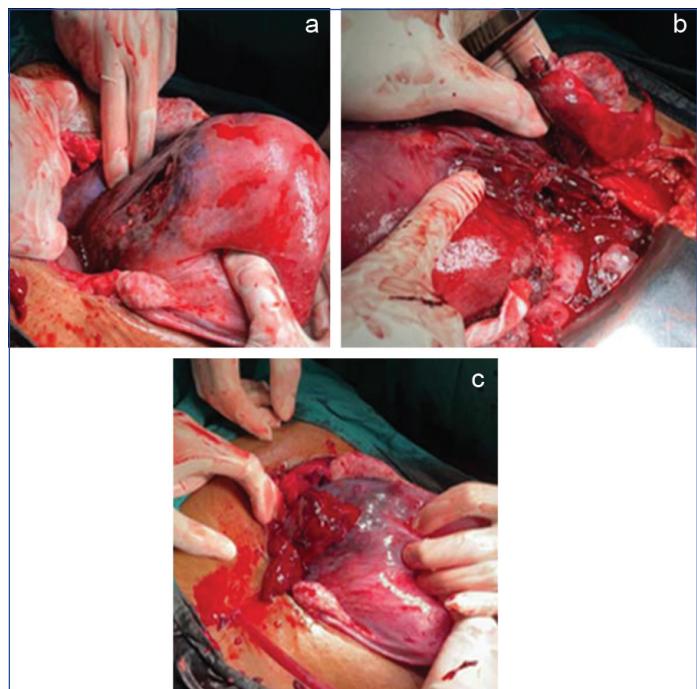
### Case 3

A 34-year-old woman (G5P2L2A2) with a history of two previous lower-segment cesarean sections (2014 and 2017) and two spontaneous abortions in 2016 and 2021, respectively, presented at 39 weeks of gestation with sudden-onset abdominal pain over the past two days. She had a 12-year history of epilepsy and was taking phenytoin 100 mg twice daily prior to conception. During the current pregnancy, her antiepileptic regimen was changed to levetiracetam (Levipil) 1 g twice daily. On examination, she was cooperative, vitally stable (blood pressure 112/72 mmHg, pulse 90 bpm), non-anaemic, and normotensive. Abdominal findings included a symphysiofundal height corresponding to 36 weeks, an irritable uterus, and a regular foetal heart rate of 144 bpm without scar tenderness. A per speculum examination was normal, and per vaginal examination revealed a 1 cm dilated cervix with minimal effacement. An emergency Lower-Segment Cesarean



**[Table/Fig-3]:** Case 2; Ruptured uterus with involvement of the bilateral broad ligaments, extending laterally and downward.

Section (LSCS) was performed due to the onset of labor following two prior cesarean deliveries. The initial procedure was uneventful. However, six hours postoperatively, the patient showed signs of hypovolemia with a pulse rate of 140 bpm, blood pressure of 90/60 mmHg, and increased abdominal girth. Ultrasound revealed a large left adnexal hematoma and free fluid in multiple abdominal compartments. Hemoglobin dropped to 6.2 g/dL. An emergency exploratory laparotomy revealed a left-sided broad ligament hematoma and uterine rupture. A life-saving obstetric hysterectomy was then performed after obtaining consent [Table/Fig-4]. The



**[Table/Fig-4]:** Case 3; Left-sided broad ligament hematoma measuring 8×10 cm, along with a uterine rupture.

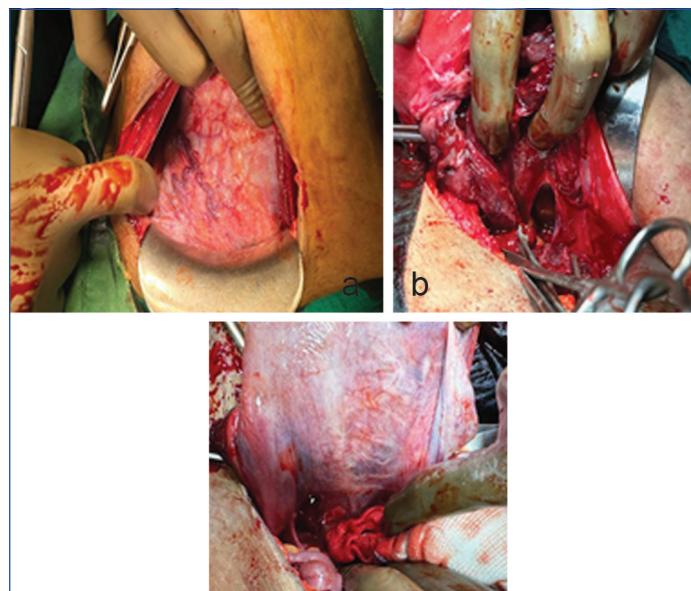
patient received intensive care, transfusions (5 PRBCs, 6 FFPs, and 2 RDPs), and antibiotics. Both mother and baby recovered well and were discharged in stable condition on postoperative day 12.

#### Case 4

A 29-year-old woman, G2P1L1, with a history of a previous cesarean section for non-progress of labor six years ago, presented to the labor room at 35 weeks and four days of gestation with complaints of diffuse abdominal pain for 12 hours and vaginal bleeding for 30 minutes. She had a known history of bronchial asthma and had been compliant with her medications. The current pregnancy was planned, and she had received regular antenatal care until her presentation.

On examination, the patient was conscious and cooperative, with a pulse of 110 bpm and blood pressure of 110/70 mmHg. Abdominal examination revealed a symphysiofundal height corresponding to 36 weeks, an irritable uterus, and scar tenderness. Foetal heart sounds were irregular, ranging from 90 to 180 bpm. A per vaginal examination showed 5 cm of cervical dilation, 70% effacement, and active bleeding. A provisional diagnosis of G2P1L1 with previous cesarean section and suspected uterine rupture was made, leading to an emergency LSCS.

Intraoperatively, a 5x3 cm rupture was found at the previous scar site, accompanied by a 3x3 cm posterior rupture, a broad ligament hematoma, and 100 mL of hemoperitoneum. A peripartum hysterectomy with hematoma drainage was performed [Table/ Fig-5a-c]. The patient received intensive care, blood transfusions, and antibiotics. Both mother and baby were discharged in stable condition on day 10.



**[Table/Fig-5]:** Case 4; a) An image depicting a stretched lower uterine segment; b) An intraoperative image showing a 5x3 cm rupture at the site of the previous scar; c) A 3x3 cm uterine rupture on the posterior surface of the uterus, medial to the left ovary, accompanied by a left-sided broad ligament haematoma.

Hence, [Table/Fig-6] shows the clinical characteristics and indications for Emergency Peripartum Hysterectomy (EPH) in four cases.

## DISCUSSION

Obstetric haemorrhage remains one of the most serious causes of maternal morbidity and mortality worldwide, contributing to nearly 27% of maternal deaths globally [1,2]. Despite improvements in obstetric care, effective management of Postpartum Haemorrhage (PPH) continues to present significant challenges, particularly in Low- and Middle-Income Countries (LMICs), where healthcare resources are often limited and timely access to care is frequently delayed [2]. EPH serves as a lifesaving surgical procedure when conservative measures to control haemorrhage fail [3,4].

Case	Gravida/Parity	Gestational age	Diagnosis modality	Indication for EPH	Foetal position
1	G4P2L2A1	36 weeks	Clinical+USG	Placenta Accreta Spectrum (PAS)	Cephalic
2	G3P2L2	Term	Clinical+USG	Uterine rupture with IUFID	Occipito-posterior
3	G5P2L2A2	39 weeks	Clinical	Broad ligament haematoma with rupture	Cephalic
4	G2P1L1	35w4d	Clinical	Anterior/posterior rupture with haematoma	Cephalic

**[Table/Fig-6]:** Clinical profile and indications for Emergency Peripartum Hysterectomy (EPH) in 4 cases.

**Incidence, causes, and risk factors:** The incidence of EPH during the study period was 0.44 per 1,000 deliveries, falling within the globally reported incidence range of 0.24–8.7 per 1,000 deliveries [4-7]. This incidence is comparable to reports from India and other LMICs, where incidence ranges from 0.26 to 1.2 per 1,000 deliveries [3,8-10]. The incidence is influenced by factors such as total delivery numbers, cesarean section rates, referral patterns, and institutional capabilities. The major causes of EPH in these cases were Placental Accreta Spectrum (PAS) and uterine rupture, consistent with global trends [4-6,11]. One patient was diagnosed with PAS, often linked to previous uterine surgeries, particularly cesarean sections [12,13]. The increasing global cesarean delivery rates have directly contributed to a rise in PAS cases, as uterine scarring creates a higher risk for abnormal placental attachment [12-14]. PAS is classified based on the depth of placental invasion into the uterine wall as accreta, increta, or percreta [12]. In one case, a patient with two prior lower-segment cesarean sections presented with massive haemorrhage due to PAS. In such situations, hysterectomy remains the most definitive intervention, although conservative approaches such as leaving the placenta in situ or performing segmental resection are also considered [13,14]. PAS was classified based on the depth of placental invasion into the uterine wall as accreta, increta, or percreta [12]. In one case, a patient with two prior lower-segment caesarean sections presented with massive haemorrhage due to PAS. In such situations, hysterectomy remained the most definitive intervention, although conservative approaches such as leaving the placenta in situ or performing segmental resection were also considered [13,14]. Russo M et al., reported improved outcomes with multidisciplinary management in PAS cases [13], while Hantoushzadeh S et al., highlighted the possibility of uterine preservation with conservative multidisciplinary approaches [14].

The remaining three cases involved uterine rupture. Two occurred in scarred uteri, while one was in a patient who lacked adequate antenatal care. Contributing factors included multiple previous caesarean sections, short interpregnancy intervals, inadequate antenatal monitoring, obstructed labor, and unmonitored intrapartum care [15-17]. Namagembe I et al., reported that up to 97% of maternal deaths from uterine rupture were preventable through adequate antenatal care and timely obstetric management [15]. Uterine rupture was associated with severe haemorrhage, often exceeding 1400 mL, necessitating urgent surgical intervention [16].

One patient presented with concealed uterine rupture complicated by a broad ligament hematoma, creating diagnostic challenges. Luke et al., described a similar concealed rupture in an unscarred uterus, underscoring the need for high clinical suspicion and a stepwise management approach [16]. Another patient developed extensive rupture of a previously scarred uterus, similar to findings reported by Agrawal et al., who emphasised early diagnosis, timely referral, and prompt management to minimise maternal and foetal morbidity [17]. These findings reinforced the importance of close hospitalisation and careful monitoring during late pregnancy in high-risk women.

Diagnosis, management, and outcomes: The clinical presentation varied depending on the underlying cause. PAS was diagnosed antenatally through ultrasound, which demonstrated key features such as loss of the clear zone, placental lacunae, and abnormal vascularity [12]. Although ultrasound aided diagnosis, its sensitivity and specificity were not absolute, necessitating multidisciplinary preoperative planning when PAS was suspected [13,14,18]. In contrast, uterine rupture cases presented as obstetric emergencies, requiring high clinical vigilance to recognise symptoms such as abdominal pain, hypotension, tachycardia, and intra-abdominal bleeding [15-17].

In LMICs, where advanced imaging resources are often limited, bedside ultrasonography and clinical judgment remain critical for timely diagnosis and management. The management of these patients involved coordinated multidisciplinary teams, including obstetricians, anesthesiologists, neonatologists, intensivists, urologists, and hematologists, aligning with international recommendations [19-21]. In the antenatally diagnosed PAS case, preoperative counseling, informed consent, and thorough surgical preparedness contributed to favorable outcomes. Surgical strategies included careful dissection, prophylactic ureteric stenting to minimise ureteral injury, and preparedness for significant haemorrhage [14,22]. Massive transfusion protocols were activated in all cases, involving the administration of packed RBCs, FFP, and platelets to address major obstetric haemorrhage [22,23]. This approach helped prevent coagulopathy, hypothermia, and acidosis, which could exacerbate haemorrhage-related morbidity [22,23]. Hemostatic agents such as tranexamic acid were also used according to protocols [19,22]. All four mothers survived, underscoring the importance of timely and comprehensive multidisciplinary care. However, such favorable outcomes were not universally observed in LMICs, where delays in care, limited blood bank capacity, and insufficient Intensive Care Unit (ICU) resources contributed to persistently high maternal mortality rates [3,4,7,24]. One intrauterine foetal demise occurred due to obstructed labor and concealed rupture, highlighting the need for early obstetric intervention [15,17,24]. The psychological impact of emergency EPH, including grief, anxiety, depression, and loss of fertility, remained a significant concern, necessitating long-term emotional and mental health support for affected women [5,20]. Although formal psychiatric evaluation was not performed, all patients were offered counseling services.

**Global Comparison, Limitations, and Future Strategies:** The small sample size limited the ability to conduct detailed statistical analysis; however, the findings were consistent with larger studies. The NOSS identified PAS and uterine rupture as the leading indications for EPH in high-resource countries [6]. Similar observations were made in large European multicenter studies, which highlighted early referral and multidisciplinary management as key factors in improving outcomes [11]. Studies from Chad, Ethiopia, and Uganda reported higher rates of EPH with poorer outcomes, reflecting the persistent challenges in resource-limited settings [7,15,24]. Preventive strategies remained essential for reducing EPH rates. These included minimising primary caesarean sections, optimising antenatal care, and closely monitoring labor in high-risk pregnancies [3,4,8,12]. Routine PAS screening protocols were recommended for women with prior caesarean scars [12-14]. Early referral to tertiary care centers with multidisciplinary teams for suspected PAS or complex uterine rupture demonstrated significant improvement in maternal outcomes, as reported in studies from high-income countries [11,13,14]. Establishing national EPH registries could provide valuable data for evidence-based guideline development and ongoing quality improvement [6,11].

## CONCLUSION(S)

PAS and uterine rupture remained two of the most important causes of obstetric haemorrhage leading to EPH. Early diagnosis, timely surgical intervention, multidisciplinary team involvement,

and psychological support were essential for improving maternal outcomes. Preventive strategies, such as minimising unnecessary caesarean deliveries, enhancing antenatal care, and strengthening institutional readiness, were critical for reducing the need for this lifesaving but often devastating intervention.

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